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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/624,082	07/21/2003	Tetsuro Inui	14321.56	5995
22913	7590	07/23/2009		
Workman Nydegger 1000 Eagle Gate Tower 60 East South Temple Salt Lake City, UT 84111			EXAMINER WOLDEKIDAN, HIBRET ASNAKE	
			ART UNIT 2613	PAPER NUMBER
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/624,082	<b>Applicant(s)</b> INUI ET AL.	
	<b>Examiner</b> Hibret A. Woldekidan	<b>Art Unit</b> 2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 23 April 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,4-19 is/are rejected.
- 7) ☒ Claim(s) 2 and 3 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

**DETAILED ACTION**

***Response to Amendment***

***Response to Arguments***

1. Examiner acknowledges receipt of Applicant's amendments, remarks, arguments received on 04/23/09. Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection.

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1,4-7,11-15 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Frankel et al. (6,980,738) in view of Kwang et al.

*("Temperature dependence of chromatic dispersion in dispersion-shifted fibers: Experiment and analysis"* Kwang S. Kim, M.E. Lines @1993: Submitted as an IDS).

Considering claim 1 Frankel discloses a method of monitoring a dispersion on a transmission optical fiber in a wavelength division multiplexing optical transmission system (**See Col. 3 lines 20-50,fig. 1,2,6 i.e. monitoring and compensating dispersion in a wdm optical transmission system(10)**) in which a transmission distance is fixed (**any optical fiber has a specific**

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**transmission distance**), said method comprising the steps of: extracting two or more of wavelength channels 1 to n from the transmission optical fiber(**See Col. 3 lines 33-37,fig. 1 i.e. a 1:N de-multiplexer(20) for extracting 1-n wavelength channels and for directing the extracted channels to a respective receiving device(22)**); and monitoring dispersions of the extracted wavelength channels(**See Col. 6 lines 23-31 i.e. the optical receivers(22) are configured to monitor signal quality. As further explained(See Col. 6 lines 64-67), the optical receivers are configured to indicate dispersion. This shows that the optical receiver is performing dispersion monitoring. Further fig. 3, illustrates dispersion amount for a respective wavelengths( $\lambda_1$ -  $\lambda_n$ ) for different temperature. This shows that the dispersion has been monitored**); extracting and monitoring being performed by a dispersion monitoring apparatus(**See Col. 3 lines 33-37, fig. 1 i.e. the communication network of fig. 1 has an extraction unit which is the demultiplexer(20) and a dispersion monitoring unit which is the receiving unit(22) where the extraction and the monitoring take place**).

Frankel does not explicitly disclose the dispersion of the transmission optical fiber has a slope that changes with respect to temperature changes

Kwang teaches the dispersion of the transmission optical fiber has a slope that changes with respect to temperature changes(**See fig. 3 i.e. an optical fiber(A) having a dispersion slope that changes in relative to temperature(T)**).

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It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Frankle, and have the dispersion of the transmission optical fiber to have a slope that changes with respect to temperature changes, as taught by Kwang, thus providing an efficient transmission system by monitoring the effects of temperature in relation to dispersion so that signal degradation can be minimized, as discussed by Kwang **(Page 2069, last paragraph )**.

Considering claim 4 Frankel discloses the method according to Claim 1, wherein the step of monitoring the dispersions comprises the steps of: measuring a first dispersion value in a desired wavelength channel at a certain temperature  $T_1$  ( $^{\circ}\text{C}$ ) **(See Col. 4 line 44 - Col. 5 line 7, fig. 3 i.e. As illustrated in fig. 3, determining the first dispersion DA in wavelength  $\lambda_1$ -  $\lambda_n$  at a certain temperature)**; measuring a second dispersion value in the desired wavelength channel at a certain other temperature  $T_2$  ( $^{\circ}\text{C}$ ) **(See Col. 4 line 44 - Col. 5 line 7, fig. 3 i.e. As illustrated in fig. 3, determining the second dispersion DB in wavelength  $\lambda_1$ -  $\lambda_n$  at a certain temperature)**; and providing a dispersion variation amount in the desired wavelength channel from a difference between the measured first dispersion and the measured second dispersion value **(See Col. 5 lines 1-25, fig. 3 i.e. providing dispersion variation amount ( $\Delta D$ ) for arbitrary wavelength based on the difference of the first and the second dispersion amount)**.

Considering claim 5 Frankel discloses a method of compensating a temperature dependency of a dispersion slope in a wavelength division

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multiplexing optical transmission system (**See Col. 3 lines 20-50, fig. 1, 2, 6 i.e. monitoring and compensating dispersion in a wdm optical transmission system(10)**) in which a transmission distance is fixed (**any optical fiber has a specific transmission distance**), said method comprising the steps of: providing the dispersion variation amount  $\Delta D(\lambda)$  by the method according to any one of Claims 2 to 4 (**See Col. 4 line 63- Col. 5 line 7, Col. 5 lines 19-25, fig. 3 i.e. as illustrated in fig. 3 providing dispersion change amount( $\Delta D$ ) in a given wavelength**); and compensating the temperature dependency of the dispersion slope by using the provided dispersion variation amount  $\Delta D(\lambda)$  (**See Col. 4 line 63- Col. 5 line 7, Col. 5 lines 19-39, fig. 3 i.e. as illustrated in fig. 3 compensating the dispersion change to have a net zero dispersion as illustrated by graph F+TA** ).

Frankel does not explicitly disclose the dispersion of the transmission optical fiber has a slope that changes with respect to temperature changes

Kwang teaches the dispersion of the transmission optical fiber has a slope that changes with respect to temperature changes (**See fig. 3 i.e. an optical fiber(A) having a dispersion slope that changes in relative to temperature(T)**).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Frankel, and have the dispersion of the transmission optical fiber to have a slope that changes with respect to temperature changes, as taught by Kwang, thus providing an efficient transmission system by monitoring the effects of temperature in relation to

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dispersion so that signal degradation can be minimized, as discussed by Kwang  
**(Page 2069, last paragraph).**

Considering claim 6 Frankel discloses the method according to Claim 5, wherein the step of compensating the temperature dependency of the dispersion slope comprises the steps of: dividing a signal light on the transmission optical fiber to one or more wavelength channel groups constituted by at least one wavelength channel(See Col. 3 lines 33-37,fig. 1 i.e. a 1:N de-multiplexer(20) for dividing the incoming wdm signals into n wavelength channels); and compensating the dispersion in accordance with each of the divided one or more wavelength channel groups(See Col. 6 lines 23-39,fig. 1 i.e. the receivers(22) of the n divided wavelength channels are configured to monitor the signal quality of the incoming channels and based on the detected signal quality, the compensating unit(18) perform appropriate dispersion compensations).

Considering claim 7 Frankel discloses the method according to Claim 5, wherein the step of compensating the temperature dependency of the dispersion slope summarizing compensates a wavelength dependency of the temperature dependency of the dispersion in all of bandwidths in a wavelength division multiplexing optical transmission system(See Col. 4 lines 8-11 and 56-67, fig. 2,3 i.e. dispersion compensating unit(18) for compensating dispersion in the incoming WDM signals).

Considering Claim 11 Frankle discloses the method according to Claim 7, wherein the step of compensating the temperature dependency of the dispersion slope comprises the step of: providing a temperature change in a dispersion

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compensating optical fiber installed at an optical node (**See Col. 6 lines 1-7, fig. 1-3, a dispersion compensator(18 of fig. 1) is installed in optical system(10 of fig. 1). The dispersion compensator(18 of fig. 2) has a thermal regulator(34 of fig. 2) for regulating or providing temperature change).**

Considering claim 12 Frankel discloses a dispersion monitoring apparatus for monitoring a dispersion on an optical fiber in a wavelength division multiplexing optical transmission system(**See Col. 3 lines 20-50,fig. 1,2,6 i.e. monitoring and compensating dispersion in a wdm optical transmission system(10))** in which a transmission distance is fixed (**any optical fiber has a specific transmission distance**), said dispersion monitoring apparatus comprising: extracting means for extracting two or more of wavelength channels from the transmission optical fiber (**See Col. 3 lines 33-37,fig. 1 i.e. a demultiplexer(20) for extracting two or more wavelength channels from the transmission optical fiber(16))**; and monitoring means for monitoring dispersions of the extracted wavelength channels(**See Col. 6 lines 23-31 i.e. the optical receivers(22) are configured to monitor signal quality. As further explained(See Col. 6 lines 64-67), the optical receivers are configured to indicate dispersion. This shows that the optical receiver is performing dispersion monitoring. Further fig. 3, illustrates dispersion amount for a respective wavelengths( $\lambda_1$ -  $\lambda_n$ ) for different temperature. This shows that the dispersion has been monitored**)).

Frankel does not explicitly disclose the dispersion of the transmission optical fiber has a slope that changes with respect to temperature changes



Kwang teaches the dispersion of the transmission optical fiber has a slope that changes with respect to temperature changes(**See fig. 3 i.e. an optical fiber(A) having a dispersion slope that changes in relative to temperature(T)).**

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Frankle, and have the dispersion of the transmission optical fiber to have a slope that changes with respect to temperature changes, as taught by Kwang, thus providing an efficient transmission system by monitoring the effects of temperature in relation to dispersion so that signal degradation can be minimized, as discussed by Kwang (**Page 2069, last paragraph** ).

Considering Claim 13 Frankel discloses a dispersion slope temperature dependency compensating apparatus For compensating a temperature dependency of a dispersion slope in a wavelength division multiplexing optical transmission system (**See Col. 3 lines 20-50,fig. 1,2,6 i.e. compensating dispersion in a wdm optical transmission system(10))** in which a transmission distance is fixed (**any optical fiber has a specific transmission distance**), said dispersion slope temperature dependency compensating apparatus comprising: monitoring means For monitoring dispersions of two or more of wavelength channels on a transmission optical fiber(**See Col. 6 lines 23-31 i.e. The optical receivers(22) for monitoring signal quality of the extracted plurality of channels from the demultiplexer(20) and the receivers are configured to monitor signal quality of the received signals. As further**

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**explained(See Col. 6 lines 64-67), the optical receivers are configured to indicate dispersion. This shows that the optical receiver is performing dispersion monitoring. Further fig. 3, illustrates dispersion amount for a respective wavelengths( $\lambda_1$ -  $\lambda_n$ ) for different temperature. This shows that the dispersion has been monitored); and**  
compensating means for compensating a wavelength dependency of the temperature dependency of the dispersion in an arbitrary wavelength channel by using the monitored dispersions **(See Col. 6 lines 23-31 i.e. optical receivers(22) for monitoring signal quality of the extracted signals from the de-multiplexing unit(20)).**

Frankel does not explicitly disclose the dispersion of the transmission optical fiber has a slope that changes with respect to temperature changes

Kwang teaches the dispersion of the transmission optical fiber has a slope that changes with respect to temperature changes**(See fig. 3 i.e. an optical fiber(A) having a dispersion slope that changes in relative to temperature(T)).**

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Frankle, and have the dispersion of the transmission optical fiber to have a slope that changes with respect to temperature changes, as taught by Kwang, thus providing an efficient transmission system by monitoring the effects of temperature in relation to dispersion so that signal degradation can be minimized, as discussed by Kwang **(Page 2069, last paragraph ).**

Considering Claim 14 Frankel discloses the step of compensating the temperature dependency of the dispersion slope according to claim 13, wherein said compensating means comprises the steps of : means for dividing a signal light on the transmission optical fiber to one or more wavelength channel groups constituted by at least one wavelength channel(See Col. 3 lines 33-37,fig. 1 i.e. **a multiplexer(14) for grouping the incoming signal light in a group of channels**); and means for compensating the dispersion in accordance with each of the divided one or more wavelength channel groups (See Col. 3 lines 38-45,fig. 1,2 i.e. **dispersion compensators(18) for compensating the group of channels received from the multiplexer(14)**).

Considering Claim15 Frankel discloses the dispersion slope temperature dependency compensating apparatus according to Claim 13, wherein said compensating means summarizing compensates the wavelength dependency of the temperature dependency of the dispersion in all of bandwidths in a wavelength division multiplexing optical transmission system(See Col. 4 lines 8-11 and 56-67, fig. 2,3 i.e. **dispersion compensating unit(18) for compensating dispersion in the incoming WDM signals**).

Considering Claims 19 Frankle discloses the dispersion slope temperature dependency compensating apparatus according to claim 15, wherein said compensating means comprises: a dispersion compensating optical fiber installed in an optical node(See Col. 6 lines 1-7, fig. 2 i.e. **installing a dispersion compensating optical fiber(DCF, 32) in a dispersion compensating module(18)**); and means for providing a temperature change to

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the dispersion compensating optical fiber(**See Col. 6 lines 1-7,fig. 1-3 i.e. providing a temperature change to the dispersion compensating optical fiber(DCF)**).

3. Claims 9,17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Frankel et al. (6,980,738) in view of Kwang et al. ( "*Temperature dependence of chromatic dispersion in dispersion-shift d fibers: Experiment and analysis*" Kwang S. Kim, M.E. Lines @1993: Submitted as an IDS) further in view of Ooi et al. (6,925,262)

Considering Claim 9 Frankel discloses the method according to Claim 6, wherein the step of compensating the dispersion is carried out by using one or more tunable dispersion equalizers(**See Col. 5 lines 2-7, Fig. 2 i.e. the compensating means(18) includes one or more tunable dispersion compensating fibers(DCF, 32)**).

Frankle and Kwang discusse using filters in dispersion compensation(**See Frankle: Col. 1 lines 50-55**).

Frankle and Kwang do not specifically disclose the dispersion compensating unit includes a filter.

Ooi teaches a dispersion compensating unit includes a filter (**See Col. 6 lines 33-37, Fig. 6 i.e. a dispersion compensating unit(42) includes a filtering unit(50)**).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Frankle and Kwang, and have the compensating unit includes a filter, as taught by Ooi, thus providing an efficient

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data transmission system by using a filtering unit in a dispersion compensating system for accurately compensate the dispersion loss as required in the system, as discussed by Ooi **(Col. 1 lines 64-67)**.

Considering Claim 17 Frankle and Kwang discloses the dispersion slope temperature dependency compensating apparatus according to Claim 14, wherein said compensating means includes one or more tunable dispersion equalizers **(See Frankle: Col. 5 lines 2-7, Fig. 2 i.e. the compensating means(18) includes one or more tunable dispersion compensating fibers(DCF, 32))**.

Frankle discusses using filters in dispersion compensation**(See Col. 1 lines 50-55)**.

Frankle and Kwang do not specifically disclose the dispersion compensating unit includes a filter.

Ooi teaches a dispersion compensating unit includes a filter as discussed in claim 9 **(See Col. 6 lines 33-37, Fig. 6 i.e. a dispersion compensating unit(42) includes a filtering unit(50))**.

4. Claims 8,10,16 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Frankel et al. (6,980,738) in view of Kwang et al. (

*“Temperature dependence of chromatic dispersion in dispersion-shifted fibers: Experiment and analysis”* Kwang S. Kim, M.E. Lines @1993: Submitted as an IDS) further in view of Eggleton (6,307,988)

Considering Claim 8 Frankle and Kwang disclose the method according to Claim 6, wherein the step of compensating the dispersion is carried out by using

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one or more tunable dispersion equalizers(See Frankle: Col. 4 line 63-Col. 5 line 7, fig. 2,3 i.e. a compensating means(18) having a tunable dispersion compensating fiber(DCF,32)).

Frankle and Kwang further discusses using Bragg gratings in dispersion compensation (See Frankle: Col. 1 lines 50-55)

Frankle and Kwang do not specifically disclose the dispersion compensating means includes a Bragg grating.

Eggleton teaches the dispersion compensating means includes a fiber Bragg grating (See Col. 2 lines 31-35, Col. 3 lines 41-48 i.e. a dispersion compensating means(20) include a Bragg grating(33)).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Frankle and Kwang, and have the dispersion compensating means includes a Bragg grating, as taught by Eggleton, thus providing an efficient data transmission system by using an automatic dispersion compensating system which is capable of compensating dispersion caused by temperature changes in the system without changing basic network parameters, as discussed by Eggleton (Col. 2 lines 19-22).

Claim 10 is rejected for the same reason as claim 8.

Considering Claim 16 Frankle and Kwang disclose the dispersion slope temperature dependency compensating apparatus according to Claim 14, wherein said compensating means includes one or more tunable dispersion equalizers(See Frankle: Col. 4 line 63-Col. 5 line 7, fig. 2,3 i.e. a

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**compensating means(18) having a tunable dispersion compensating fiber(DCF,32)).**

Frankle further discusses using Bragg gratings in dispersion compensation **(See Col. 1 lines 50-55)**

Frankle and Kwang do not specifically disclose the dispersion compensating means includes a Bragg grating.

Eggleton teaches the dispersion compensating means includes a fiber Bragg grating as discussed in claim 8 **(See Col. 2 lines 31-35, Col. 3 lines 41-48 i.e. a dispersion compensating means(20) include a Bragg grating(33)).**

Claim 18 is rejected for the same reason as claim 16.

#### ***Allowable Subject Matter***

1. Claims 2,3 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

#### ***Conclusions***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hibret A. Woldekidan whose telephone number is (571)270-5145. The examiner can normally be reached on 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Vanderpuye can be reached on 5712723078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/H. A. W./  
Examiner, Art Unit 2613

/Kenneth N Vanderpuye/  
Supervisory Patent Examiner, Art Unit 2613